Laboratory	**Alcalab Private Limited, 3rd Floor, Ashiana Trade Centre, Adityapur, Jamshedpur, Jharkhand**		
Accreditation Standard	**ISO/IEC 17025:2005**		
Discipline	**Electro-Technical Calibration**	**Issue Date**	**24.09.2015**
Certificate Number	**C-0289**	**Valid Until**	**23.09.2017**
Last Amended on	**-**	**Page**	**1 of 6**

	Quantity Measured / Instrument	Range/ Frequency	* Calibration Measurement Capability (±)	Remarks
	SOURCE			
1.	**DC VOLTAGE**[$]	0.1 mV to 100 mV 100 mV to 1 V 1 V to 100 V 100 V to 1000 V	3.52 % to 0.01 % 0.01 % to 0.009 % 0.009 % 0.009 % to 0.0066 %	Using DMM 8508A with Calibrator 5500A by Direct/Comparison Method
2.	**DC CURRENT**[$]	100 µA to 10 mA 10 mA to 100 mA 100 mA to 10A	0.65 % to 0.075 % 0.0758 % 0.075 % to 0.09 %	Using DMM 8508A with Calibrator 5500A by Direct/Comparison Method
3.	**DC HIGH CURRENT**[$]	10 A to 550 A	0.9 %	Using DMM 8508A with Calibrator 5500A + 50 Turn Coil by Direct /Comparison Method
4.	**RESISTANCE**[$]	10 mΩ to 1 Ω 1 Ω to 10 Ω 10 Ω to 10 kΩ 10 kΩ to 10 MΩ 10 MΩ to 100 MΩ 1 GΩ to 10 GΩ	0.15 % to 0.08 % 0.08 % 0.08 % 0.08 % 0.08 % 6.2 %	Using DMM 8508A with Calibrator 5500A & Decade Megohm Boxes (Model-8400 & 8400 HV) & Decade Resistance Box (Model-7400) by Direct /Comparison Method
5.	**HIGH RESISTANCE**[$] **(for Insulation Tester)**	0.5 MΩ to 10 GΩ (50V to 5000V)	2.75 % to 6.3 %	Using Decade Megohm Boxes (Model-8400 & 8400 HV) by Direct / Comparison Method
6.	**RESISTANCE**[$] **(for Earth Tester)**	0.5 Ω to 200 Ω	2.3 % to 0.5 %	Using Decade Resistance Box (Model 7400) by Direct /Comparison Method

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Quantity Measured / Instrument	Range/ Frequency	* Calibration Measurement Capability (±)	Remarks
7. AC VOLTAGE$	**50 Hz to 10 kHz**		Using DMM 8508A with Calibrator 5500A By Direct Method
	1mV to 10 mV	0.5 %	
	10 mV to 10 V	0.5 % to 0.02 %	
	10 V to 100 V	0.02 %	
	50 Hz to 10 kHz		
	100 V to 1000 V	0.02 %	
8. AC CURRENT$	**50 Hz to 10 kHz**		Using DMM 8508A with Calibrator 5500A By Direct Method
	100 µA to 10 mA	0.45 % to 0.15 %	
	10 mA to 100 mA	0.15 %	
	100 mA to 10 A	0.15 % to 0.16 %	
9. AC HIGH CURRENT$	10 A to 550A	0.6 % to 0.9 %	Using DMM 8508A with Calibrator 5500A + 50 Turn Coil By Direct Method
10. POWER / ENERGY$ (1Φ & 3Φ)	**50 Hz**	2.5 % to 0.3 %	Using Energy Meter (Conzerv) with Calibrator by Comparison Method
	110 V to 250 V		
	1 A to 5 A		
	0.5 to 1.00 P.F. (Lead & Lag)		
11. CAPACITANCE$	**1 kHz**		Using Calibrator 5500A By Direct Method
	50 nF to to 1000 µF	1.5 %	
12. FREQUENCY$	10 Hz to 1 MHz	0.08 %	Using Calibrator 5500A By Direct Method
13. INDUCTANCE$	**1 kHz**		Using Decade Inductance Box (Zeal-ZSDIB) By Direct Method
	10 µH to 1000 mH	2.9 % to 4.8 %	

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Quantity Measured / Instrument	Range/ Frequency	* Calibration Measurement Capability (±)	Remarks
14. POWER FACTOR[$]	**45 Hz to 55 Hz** (-)1 to 1	 0.25 %	Using Energy Meter (Conzerv) with Calibrator by Comparison Method
15. TEMPERATURE SIMULATION[#]			
RTD TYPE	(-)200 ^{0}C to 600 ^{0}C	0.07 ^{0}C to 0.42 ^{0}C	Using Calibrator 5500A + ITS 90 (mV & Ω method) By Direct Method
Thermocouples			
J Type	0 ^{0}C to 750 ^{0}C	0.3 ^{0}C	
K Type	(-) 200 ^{0}C to 1250 ^{0}C	0.3 ^{0}C	
R Type	0 ^{0}C to 1600 ^{0}C	0.65 ^{0}C	
S Type	0 ^{0}C to 1600 ^{0}C	0.65 ^{0}C	
16. DC VOLTAGE[♣]	2 mV to 100 mV	0.92 %	Using Calibrator 5500A By Direct/ Comparison Method
	100 mV to 1 V	0.92 %	
	1 V to 1000 V	0.92 % to 0.06 %	
17. DC CURRENT[♣]	100 µA to 1 mA	0.65 %	Using Calibrator 5500A By Direct/ Comparison Method
	1 mA to 100 mA	0.65 %	
	100 mA to 1 A	0.65 %	
	1 A to 10A	0.2 %	
18. RESISTANCE[♣]	1 Ω to 10 Ω	1.12 % to 0.15 %	Using Calibrator 5500A By Direct/ Comparison Method
	10 Ω to 100 Ω	0.15 %	
	100 Ω to 1 MΩ	0.15 %	
	1 MΩ to 10 MΩ	0.15 %	
	10 MΩ to 50 MΩ	0.15 % to 0.6 %	
19. HIGH RESISTANCE[♣] **(for Insulation Tester)**	0.2 MΩ to 10 GΩ (50V to 5000V)	2.75 % to 6.3 %	Using Decade Megohm Boxes By Direct/ Comparison Method

Quantity Measured / Instrument	Range/ Frequency	* Calibration Measurement Capability (±)	Remarks
20. RESISTANCE♣ (for Earth Tester)	0.2 Ω to 200 Ω	3.5 % to 0.5 %	Using Decade Resistance Box (Model 7400) By Direct/ Comparison Method
21. AC VOLTAGE♣	**50 Hz to 10 kHz**		Using Calibrator 5500A By Direct/ Comparison Method
	30 mV to 100 mV	0.5 % to 0.68 %	
	100 mV to 10 V	0.68 %	
	10 V to 100 V	0.68 %	
	50 Hz to 1 kHz		
	100 V to 1000 V	0.15 % to 0.21 %	
22. AC CURRENT♣	**50 Hz**		Using Calibrator 5500A By Direct/ Comparison Method
	10 mA to 100 mA	0.35 %	
	100 mA to 10 A	0.35 % to 0.17 %	
23. FREQUENCY♣	50 Hz to 1 MHz	0.02 %	Using Calibrator 5500A By Direct/ Comparison Method
24. POWER / ENERGY♣ (1Φ & 3Φ)	**50 Hz** 110 V to 250 V 1 A to 5 A 0.5 to 1.00 P.F. (Lead & Lag)	3.0 % to 0.3 %	Using Energy Meter (Conzerv) By Direct/ Comparison Method
25. STOP WATCH / TIMER MECHANICAL / DIGITAL♣			Using Master Stop Watch by Comparison Method
L. C. : 0.01minute	0 to 60 m	0.5 second	
L. C. : 1 minute		35 second	

Quantity Measured / Instrument	Range/ Frequency	* Calibration Measurement Capability (±)	Remarks
MEASURE			
1. DC VOLTAGE$	0.1 mV to 100 mV	0.25 % to 0.005 %	Using DMM 8508 A
	100 mV to 1 V	0.005 % to 0.002 %	By Direct Method
	1 V to 1000 V	0.002 %	
2. DC CURRENT$	100 µA to 1 mA	0.005 % to 0.008 %	Using DMM 8508 A
	1 mA to 100 mA	0.008 % to 0.005 %	By Direct Method
	100 mA to 1 A	0.005 % to 0.025 %	
	1 A to 10 A	0.025 % to 0.052 %	
3. FREQUENCY$	5 Hz to 1 MHz	0.15 % to 0.06 %	Using DMM 8508 A by Comparison Method
4. RESISTANCE$	10 mΩ to 1 Ω	0.31 %	Using DMM 8508 A
	1 Ω to 10 Ω	0.31 %	
	10 Ω to 100 Ω	0.31 %	
	100 Ω to 100 MΩ	0.31 %	
	100 MΩ to 1 GΩ	0.31 % to 0.35 %	
	1 GΩ to 10 GΩ	0.35 % to 2.5 %	
5. AC VOLTAGE$	**50 Hz to 10 kHz**		Using DMM 8508 A
	1 mV to 10 mV	0.69 % to 0.09 %	By Direct Method
	10 mV to 10 V	0.09 %	
	10 V to 100 V	0.013 % to 0.09 %	
	50 Hz to 10 kHz		
	100 V to 1000 V	0.09 % to 0.016 %	
6. AC CURRENT$	**50 Hz to 10 kHz**		Using DMM 8508 A
	100 µA to 100 mA	0.15 % to 0.07 %	By Direct Method
	100 mA to 10 A	0.07 % to 0.14 %	

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	Quantity Measured / Instrument	Range/ Frequency	* Calibration Measurement Capability (±)	Remarks
7.	**DC HIGH VOLTAGE$**	1 KV to 5 KV	3.7 %	Using High Voltage Probe (Model - 80K-40) with 4½ DMM By Direct Method
8.	**AC HIGH VOLTAGE$**	1 KV to 20 KV	4.1 %	Using High Voltage Probe (Model-80K-40) with 4½ DMM By Direct Method
9.	**POWER / ENERGY$ (1Φ & 3Φ)**	**50 Hz** 110 V to 250 V 1 A to 5 A 0.5 to 1.00 P.F. (Lead & Lag)	2.5 % to 0.3 %	Using Energy Meter (Conzerv) with Calibrator By Comparison Method
10.	**POWER FACTOR$**	**45 Hz to 55 Hz** (-)1 to 1	0.25 %	Using Energy Meter (Conzerv) with Calibrator by Comparison Method
11.	**TEMPERATURE SIMULATION$**			
	RTD TYPE	(-)200 ^{0}C to 600 ^{0}C	0.07 ^{0}C to 0.42 ^{0}C	Using Fluke 5500A + ITS 90
	Thermocouples			
	J Type	0 ^{0}C to 750 ^{0}C	0.3 ^{0}C	
	K Type	(-)200 ^{0}C to 1250 ^{0}C	0.3 ^{0}C	
	R Type	0 ^{0}C to 1600 ^{0}C	0.65 ^{0}C	
	S Type	0 ^{0}C to 1600 ^{0}C	0.65 ^{0}C	
12.	**STOP WATCH / TIMER$ (MECHANICAL / DIGITAL)**			
	L.C. 0.01 minute	0 to 60 Minutes	0.5 sec	Using Master Stop Watch
	L.C. 1 minute		35 sec	By Comparison Method

*** Measurement Capability is expressed as an uncertainty (±) at a confidence probability of 95%**
$Only in Permanent Laboratory
♣Only for Site Calibration
 # The laboratory is also capable for site calibration however, the uncertainty at site depends on the prevailing actual environmental conditions and master equipment used.

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